

Large-Scale Demonstration and Deployment Project Fact Sheet

Hot Cell Decontamination and Decommissioning at the West Valley Demonstration Project

In Partnership with the Office of Science and Technology

Introduction

The West Valley Demonstration Project (WVDP), located in western New York, is a former commercial nuclear fuel reprocessing facility that recovered uranium and plutonium from spent nuclear fuel. Beginning in fiscal year 2002 WVDP will host a large-scale demonstration and deployment project (LSDDP) focused on the safe and cost-effective decontamination and decommissioning (D&D) of highly-contaminated hot cell facilities. As part of ongoing D&D efforts, WVDP will demonstrate improved technologies for remote waste characterization, retrieval, processing and packaging. Such technologies have the potential to reduce costs, shorten schedules, enhance safety, and can be used across the DOE complex.

Background

The reprocessing operations at West Valley generated approximately 600,000 gallons of liquid high-level waste (HLW) that was stored in underground tanks. The liquid HLW is currently being solidified by vitrification. Stainless steel canisters of vitrified HLW are being stored in a process cell that was modified to provide temporary onsite storage pending shipment to an interim or final storage facility.

Project activities, including the vitrification of HLW, have resulted in highly radioactively contaminated waste in many forms, including vessels and equipment, spent ion exchange resins, laboratory wastes, ventilation system filters, and debris from spent fuel storage and reprocessing operations. These materials must be

removed, properly prepared, and dispositioned to achieve the WVDP's mission and reach its end state. To do this, various activities need to be carried out in hot cell areas at the WVDP site, including remote or semi-remote equipment and debris removal and surface cleaning.

Project Scope

The purpose of this LSDDP is to demonstrate and deploy new and innovative technologies applicable to D&D of hot cell facilities. Two primary facilities have been selected for demonstration sites at WVDP because of their ongoing D&D. The first, the Head End Cells (HEC), which includes the Process Mechanical Cell (PMC) and the General Purpose Cell (GPC), were used to mechanically process irradiated nuclear fuel assemblies. The HEC contains significant amounts of highly radioactive debris and laboratory equipment.



General Purpose Cell

The second facility is the Extraction Cells, which includes two shielded hot cells--Extraction Cell 1 (XC1) and Extraction Cell 2 (XC2)--where dissolved nuclear fuel was separated from fission products. The cells contain solvent-contaminated process vessels, tanks and piping that will require remote removal prior to surface decontamination activities. In addition to these facilities, demonstrations will also be targeted in the Fuel Storage Areas including the Fuel Storage Pool (FSP), Cask Unloading Pool (CUP) and Water Treatment Area (WTA).

Technical Needs

The WVDP hot cell facilities were selected to host this project because they are representative of remote hot cell facilities throughout the DOE complex. The innovative technologies demonstrated will be selected to provide solutions to West Valley's identified technical needs, which include:

- Low-level and TRU waste characterization (OH-WV-901)
- Decontamination of high-level waste canisters (OH-WV-902)

- Remote handled waste processing (OH-WV-909)
- Size reduction of components (OH-WV-910)
- Far-field radioactivity measurement (OH-WV-913)
- Remote underwater size reduction (OH-WV-917)

Many other DOE sites and national laboratories have hot cell facilities that will require clean-up as their missions progress towards environmental restoration and/or completion. Most of these facilities are found to have similar innovative technology needs in the area of remote operations. For this reason, non-host site demonstrations and deployments have been incorporated into the initial planning for this LSDDP at the Battelle Columbus West Jefferson Site and at Hanford's 324/327 Hot Cell facility. Both sites possess D&D needs similar to the WVDP's hot cells.

Current Status

Project funding has been secured and a project kick-off meeting was held on October 10, 2001.

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